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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/759,106	01/20/2004	Tetsuya Yoshimura	461-155	6924

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EXAMINER

BOECKMANN, JASON J

ART UNIT PAPER NUMBER

3752

DATE MAILED: 02/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/759,106	YOSHIMURA ET AL.	
	Examiner	Art Unit	
	Jason J. Boeckmann	3752	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11/30/2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-7,9-13 and 15-18 is/are rejected.
- 7) ☒ Claim(s) 3,8,13 and 14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 1/30/2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

Applicant's arguments with respect to claims 1 and 2 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

Claim 13 is objected to because of the following informalities: It appears that there are numerous grammatical errors within the claim. For example, examiner believes that the words "the fuel" in line 6 should be removed. Additionally, in line 8, the words "and presses," should be replaced with "that presses against." Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 5 and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Erickson et al (4,304,410).

Erickson et al shows a sliding structure of a shaft member (4) in which the shaft member is retained slidably in a guide hole (1a). A plurality of labyrinth grooves (4c) are formed in both axial end portions of the slide surface of the shaft

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member (4) and are always in slidable contact with the guide hole (1a). The intermediate portion of the shaft member, between the axial end portions is free from grooves. Regarding claims 5 and 7, Erickson et al shows three grooves on each end portion with the axial length of the intermediate portion being longer than that of each of the grooved axial end portions (figure 5).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 2, 4, 6, 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hofmann (6,283,389) in view of Erickson et al (4,304,410).

Hofmann shows an injector having a needle (7) and a shaft member (23) retained slidably in a guide hole (5) in the nozzle wall and is displaced in the axial direction to switch between fuel injection and termination of fuel injection. A

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plurality of labyrinth grooves (25) are formed on the slide surface of the shaft member (23) with each of the grooves having a width of approximately 1.6mm and a pitch of 1.0mm (column 3, lines 61-65). Hofmann does not specifically disclose that the plurality of labyrinth grooves are on both axially end portions of the shaft member with the mid section being free from the grooves. However, Erickson et al shows a sliding structure of a shaft member (4) in which the shaft member is retained slidably in a guide hole (1a). Three labyrinth grooves (4c) are formed in both axial end portions of the slide surface of the shaft member (4) and are always in slidable contact with the guide hole (1a). The intermediate portion of the shaft member, between the axial end portions is free from grooves with the axial length of the intermediate portion being longer than that of each of the grooved axial end portions (figure 5). It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention, under the teachings of Erickson et al, to position the plurality of labyrinth grooves on both axial end portions of the shaft member (23), in Hofmann's injector, leaving the intermediate portion to have a constant diameter that is free from grooves. This repositioning of the already existing grooves would reduce friction between the shaft member and the guide hole, as well as reduce the amount of fuel that passes alongside the shaft member.

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Claims 13, 16 and 18 are rejected, as well as understood, under 35 U.S.C. 103(a) as being unpatentable over Boecking (6,817,542) in view of Erickson et al (4,304,410).

Boecking shows an injector having a needle (20), which is inserted into a nozzle with fuel for injection and is displaced in the axial direction to switch between fuel injection and termination of fuel injection. A valve chamber (12) including a valve body (13) for isolating a back pressure chamber (21) from a low-pressure source (18). The valve body (13) is located in the low-pressure flow path (18) for releasing low-pressure fuel into to back pressure chamber (21) to which high-pressure fuel is supplied via line 22. Boecking includes a piston (5), which is made up of a shaft member that presses against the valve body (13) and is retained slidably in a guide hole (figure 1). Boecking does not specifically disclose that the piston contains a plurality of labyrinth grooves formed in both axial end portions of the slide surface of the shaft member and that the intermediate portion of the shaft member located between the axial end portions has a constant diameter and is free form grooves. However, Erickson et al shows a piston (4) that contains a plurality of labyrinth grooves (4c) formed in both axial end portions of the slide surface of the shaft member. The intermediate portion of the shaft member located between the axial end portions has a constant diameter and is free form grooves (figure 5). It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention, to add the plurality of labyrinth grooves, of Erickson et al, on both axial end portions of the slide surface of piston (5), of Boecking, leaving the intermediate portion to have a

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constant diameter that is free form grooves in order to reduce friction between the shaft member and the guide hole, as well as reduce the amount of fuel that passes alongside the shaft member. Regarding claims 16 and 18, Erickson et al shows three grooves on each axial end portion and that the intermediate portion has an axial length greater than an axial length of either grooved axial end portions (figure 5).

Claims 15 and 17 are rejected, as well as understood, under 35 U.S.C. 103(a) as being unpatentable over Boecking (6,817,542) in view of Erickson et al (4,304,410) further in view of Hofmann (6,283,389).

Boecking, as modified by Erickson et al, shows all aspects of the applicants invention as in claim 13, but does not specifically disclose that the grooves have a width equal to or less than 0.6 mm and a pitch of 0.1 to 1.0 mm. However, Hofmann shows an injector having a needle (7) and a shaft member (23) retained slidably in a guide hole (5) in the nozzle wall and is displaced in the axial direction to switch between fuel injection and termination of fuel injection. A plurality of labyrinth grooves (25) are formed on the slide surface of the shaft member (23) with each of the grooves having a width of approximately 1.6 mm and a pitch of 1.0 mm (column 3, lines 61-65). It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention, under the teachings of Hofmann to position the annular grooves at a pitch of 1.0 mm with a width of 1.6 mm, in order to reduce friction between the shaft member and the

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guide hole, as well as reduce the amount of fuel that passes alongside the shaft member.

Allowable Subject Matter

Claims 3, 8 and 14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason J. Boeckmann whose telephone number is (571) 272-2708. The examiner can normally be reached on 7:30 - 5:00 m-f, first Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David A. Scherbel can be reached on (571) 272-4919. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JJB JJB 2-17-06



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